at the same impact point. For head impacts on the opposite side of the head, the 30-minute waiting period specified in §572.155(m) does not apply.

§572.153 Neck-headform assembly and test procedure.

(a) The neck and headform assembly (refer to §§572.150(a)(1)(ii) and 572.150(a)(1)(iii)) for the purposes of this test consists of parts shown in CRABI neck test assembly (drawing TE–3200–100);

(b) When the neck and headform assembly, as defined in §572.153(a), is tested according to the test procedure in §572.153(c), it shall have the following characteristics:

(1) *Flexion.* (i) Plane D referenced in Figure R3 of this subpart shall rotate in the direction of pre-impact flight with respect to the pendulum's longitudinal centerline not less than 75 degrees and not more than 86 degrees. Within this specified rotation corridor, the peak positive moment about the occipital condyles shall be not less than 36 N-m (26.6 ft-lbf) and not more than 45 N-m (33.2 ft-lbf).

(ii) The positive moment about the occipital condyles shall decay for the first time to 5 N-m (3.7 ft-lbf) between 60 ms and 80 ms after time zero.

(iii) The moment about the occipital condyles shall be calculated by the following formula: Moment (N-m) = My − (0.005842m) × (Fx), where My is the moment about the y-axis, Fx is the shear force measured by the neck transducer (drawing SA572 –S23) and 0.005842m is the distance from the point at which the load cell measures the force to the occipital condyle.

(2) *Extension.* (i) Plane D referenced in Figure R4 of this subpart shall rotate in the direction of preimpact flight with respect to the pendulum's longitudinal centerline not less than 80 degrees and not more than 92 degrees. Within the specified rotation corridor, the peak negative moment about the occipital condyles shall be not more than −12 Nm (−8.9 ft-lbf) and not less than −23 N-m (−17.0 ft-lbf) within the minimum and maximum rotation interval.

(ii) The negative moment about the occipital condyles shall decay for the first time to −5 Nm (−3.7 lbf-ft) between 76 ms and 90 ms after time zero.

(iii) The moment about the occipital condyles shall be calculated by the following formula: Moment (N-m) = My − (0.005842m) × (Fx), where My is the moment about the y-axis, Fx is the shear force measured by the neck transducer (drawing SA572 –S23) and 0.005842m is the distance from the point at which the load cell measures the force to the occipital condyle.

(c) *Test procedure.* (1) Soak the neck assembly in a controlled environment at any temperature between 20.6 and 22.2 °C (69 and 72 °F) and at any relative humidity between 10 and 70 percent for at least four hours prior to a test. These temperature and humidity levels shall be maintained throughout the testing period specified in this section.

(2) Torque the jam nut (drawing 9001336) on the neck cable (drawing ATD–6206) to 0.2 to 0.3 Nm (2–3 in-lbf).

(3) Mount the neck-headform assembly, defined in paragraph (b) of this section, on the pendulum so the midsagittal plane of the headform is vertical and coincides with the plane of motion of the pendulum as shown in Figure R3 for flexion and Figure R4 for extension tests.

(i) The moment and rotation data channels are defined to be zero when the longitudinal centerline of the neck and pendulum are parallel.

(ii) The test shall be conducted without inducing any torsion of the neck.

(4) Release the pendulum and allow it to fall freely to achieve an impact velocity of 5.2 ±0.1 m/s (17.1 ±0.3 ft/s) for flexion and 2.5 ±0.1 m/s (8.2 ±0.3 ft/s) for extension measured at the center of the pendulum accelerometer at the instant of contact with the honeycomb.

(i) Time-zero is defined as the time of initial contact between the pendulum striker plate and the honeycomb material. The pendulum data channel shall be defined to be zero at this time.

(ii) Stop the pendulum from the initial velocity with an acceleration vs. time pulse which meets the velocity change as specified in the following table. Integrate the pendulum acceleration data channel to obtain the velocity vs. time curve as indicated in Table B:

TABLE B.—PENDULUM PULSE

Time	Flexion		Time	Extension	
m/s	m/s	ft/s	ms	m/s	ft/s
10	1.6–2.3	5.2–7.5	6	0.8–1.2	2.6–3.9
20	3.4–4.2	11.2–13.8	10	1.5–2.1	4.9–6.9
25	4.3–5.2	14.1–17.1	14	2.2–2.9	7.2–9.5

§ 572.154 Thorax assembly and test procedure.

(a) Thorax Assembly (refer to § 572.150(a)(1)(iv)) . The thorax consists of the part of the torso assembly shown in drawing 921022–060.

(b) When the thorax of a completely assembled dummy (drawing 921022–000) is impacted by a test probe conforming to § 572.155(a) at 5.0 ±0.1m/s (16.5 ±0.3 ft/s) according to the test procedure in paragraph (c) of this section, the peak force, measured by the impact probe in accordance with paragraph § 572.155(a), shall be not less than 1514 N (340.7 lbf) and not more than 1796 N (404.1 lbf).

(c) *Test procedure.* (1) Soak the dummy in a controlled environment at any temperature between 20.6 and 22.2 °C (69 and 72 °F) and at any relative humidity between 10 and 70 percent for at least four hours prior to a test. These temperature and humidity levels shall be maintained throughout the entire testing period specified in this section.

(2) The test dummy is clothed in a cotton-polyester based tight fitting sweat shirt with long sleeves and ankle long pants whose combined weight is not more than 0.25 kg (.55 lbs).

(3) Seat and orient the dummy on a level seating surface without back support as shown in Figure R5 of this subpart, with the lower limbs extended forward, parallel to the midsagittal plane and the arms 0 to 5 degrees forward of vertical. The dummy's midsagittal plane is vertical within ±/1 degree and the posterior surface of the upper spine box is aligned at 90±/1 degrees from the horizontal. (Shim material may be used under the upper legs to maintain the dummy's specified spine box surface alignment).

(4) Establish the impact point at the chest midsagittal plane so that the impact point of the longitudinal centerline of the probe coincides with the dummy's midsagittal plane, is centered on the torso 196 ±/2.5 mm (7.7 ±/0.1 in) vertically from the plane of the seating surface, and is within 0.5 degrees of a horizontal plane.

(5) Impact the thorax with the test probe so that at the moment of contact the probe's longitudinal center line falls within 2 degrees of a horizontal line in the dummy's midsagittal plane.

(6) Guide the test probe during impact so that there is no significant lateral, vertical or rotational movement.

EFFECTIVE DATE NOTE: At 66 FR 45784, Aug. 30, 2001, § 572.154 was amended by adding paragraph (c)(7), effective Oct. 29, 2001. For the convenience of the user, the added text is set forth as follows:

§ 572.154 Thorax assembly and test procedure.

* * * * *

(c) * * *

(7) No suspension hardware, suspension cables, or any other attachments to the probe, including the velocity vane, shall make contact with the dummy during the test.

§ 572.155 Test conditions and instrumentation.

(a) The test probe for thoracic impacts shall be of rigid metallic construction, concentric in shape, and symmetric about its longitudinal axis. It shall have a mass of 2.86±0.02 kg (6.3±0.05 lbs) and a minimum mass moment of inertia of 622 kg-cm^2 (0.55 lbs-in-sec^2) in yaw and pitch about the CG. Up to 1/3 of the weight of the suspension cables and their attachments to the impact probe may be included in the calculation of mass, but such components may not exceed five percent of the total weight of the test probe. The impacting end of the probe, perpendicular to and concentric with the longitudinal axis, must be at least 12.7 mm (0.5 in) thick, and have a flat, continuous, and non-deformable 101.6 ± 0.25